AECOM

U-Values & Approach to Thermal Bridging Report

100 Avenue Road, Swiss Cottage

May 2017

Quality information

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Revision History

Revision	Revision date	Authorized	Name
Final for issue.	30.05.17	GS	Gill Smith

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1. Condition 27

The original planning consent (2014/1617/P dated 18-02-16) was granted for the site with condition 27 attached which reads:

> "Before any development commences details of proposed U-values and the approach to thermal bridging shall be submitted to and approved in writing by the Local Planning Authority. The development shall be carried out in the accordance with approved details."

On the 11-04-16 an application was made to amend condition 27 to require details before the relevant part of the work commences other than demolition. The amendment was granted on 10-05-2016. The replacement condition reads:

> "Development works (other than demolition) shall not take place until details of proposed u-values and the approach to thermal bridging shall be submitted to and approved in writing by the Local Planning Authority. The development shall be carried out in accordance with the approved details."

The U-values and approach to Thermal Bridging have been agreed between, AECOM Building Physics Team, Wintech Façade Engineering Consultants and Grid Architects– all of who have been providing advice and guidance to the client development team regarding the building fabric for a number of years. Their work relating to the proposed U-values and the approach to the thermal bridging is contained within this report.

2. U-values

With regard to u-values condition 27 says "details of proposed U-values …….. shall be submitted to ……the Local Planning Authority".

A U-value is the measurement of movement of temperature through a material. U-values are represented as a number that is a measurement in watts per square metre of surface area for a temperature gradient of one kelvin for every metre of thickness when the difference between the inner and outer face is 1 degree Celsius (W/mK).

The more effective a material is at reducing temperature movement the lower the U-value. Reduced movement helps to stabilise internal temperatures so that in theory they require less mechanical inputs to retain an operational temperature throughout the year.

The Government sets U-values for new build dwellings within Part L1A of the Building Regulations and U-values for new build commercial units are contained within Part L2A of the Building Regulations.

The buildings within the site known as 100 Avenue Road, Swiss Cottage (hereafter referred to as the site) is following Building Regulations Part L 2013.

Building Regulations Part L1A and Part L2A contain 'Limiting Values'. These are the U-values that must not be exceeded for any one building element.

The 'Limiting Values' can be averaged where one or more form of a building element is present. This approach has been taken for the roof U-value and the average calculations are as follows:

Tower Block

Terrace Roof Area = 72m² x U-value of 0.25 = 18

Main Roof Area = 475m² x U-value of 0.15 = 72

(72 + 18) / 547 = U-value of 0.16 W/m²K

Lower Block

Terrace Roof Area = 570m² x U-value of 0.25 = 142

Main Roof Area = 790m² x U-value of 0.12 = 95

(142 + 95) / 1,360 = U-value of 0.17 W/m²K

The corridors and stairwells are to be fitted with heat emitters and this means that walls and doors facing onto these areas are sheltered rather than being a surface exposed to externally influencing temperatures.

As can be seen in Table 2a & 2b the U-values for the buildings within the site, that the design team and client are proposing to target for all other building elements, exceed Building Regulations part L1A & L2A 2013 Limiting Values.

Table 2a: Residential U-values

Building Element	Building Regulations Part L1A 2013 Limiting Values	Target U-values for the site
Floors		
Separating Floor between Residential and Commercial (Tower and Lower Block)	0.25 W/m²K	0.12 W/m²K
Walls		
Tower Block External Walls	0.30 W/m²K	0.17 W/m²K
Lower Block External Walls (Floors 01 to 04)	0.30 W/m²K	0.17 W/m²K
Lower Block External Walls (Floors 05 to 06)	0.30 W/m²K	0.18 W/m²K
Party / Corridor / Stairwell Walls (Tower and Lower Block)	0.20 W/m²K	0.00 W/m²K
Roofs		
Tower Block Average Roof U-value	0.20 W/m²K	0.16 W/m²K
Lower Block Average Roof U-value	0.20 W/m²K	0.17 W/m²K
Openings		
Tower Block Glazed Systems (Floors 01 to 20)	2.00 W/m²K	1.50 W/m²K
Tower Block Glazed Systems (Floors 21 to 22)	2.00 W/m²K	1.35 W/m²K
Lower Block Glazed Systems (Floors 01 to 06)	2.00 W/m²K	1.50 W/m²K
Individual Apartment Entrance Doors	2.00 W/m²K	0.00 W/m²K

Table 2b: Commercial U-values

Building Element	Building Regulations Part L1A 2013 Limiting Values	Target U-values for the site
Floors		
Ground Floor	0.25 W/m²K	0.12 W/m²K
Walls		
Retail Unit 4 External Wall (Tower Block)	0.35 W/m²K	0.17 W/m²K
Amenity Floor 23 External Wall (Tower Block)	0.35 W/m²K	0.20 W/m²K
Retail Units 1, 2 and 3 External Wall (Lower Block, North East and South)	0.35 W/m²K	0.25 W/m²K
Retail Units 1, 2 and 3 External Wall (Lower Block, West)	0.35 W/m²K	0.19 W/m²K
The Winch External Wall (Lower Block, Floor 00 only)	0.35 W/m²K	0.19 W/m²K
The Winch External Wall (Lower Block, Floor 01 to 04)	0.35 W/m²K	0.18 W/m²K
The Winch External Wall (Lower Block, Floor 05 to 06)	0.35 W/m²K	0.17 W/m²K
Roofs		
Tower Block Average Roof U-value	0.25 W/m²K	0.16 W/m²K
Lower Block Average Roof U-value	0.25 W/m²K	0.17 W/m²K
Openings		
Amenity Floor 23 (Tower Block)	2.20 W/m²K	1.40 W/m²K
Retail Units 1, 2 and 3 (Lower Block)	2.20 W/m²K	1.60 W/m²K
Retail Unit 4 (Tower Block)	2.20 W/m²K	1.60 W/m²K
The Winch (Lower Block)	2.20 W/m²K	1.50 W/m²K
Glazed Entrance Doors (Ground Floor High Usage Entrance Doors)	3.50 W/m²K	3.50 W/m²K

3. Thermal Bridging

With regard to thermal bridging condition 27 says *"details of proposed …….. approach to thermal bridging shall be submitted to ……the Local Planning Authority".*

The architects will detail the junctions to avoid thermal bridging pathways. This will clearly demonstrate that some of the junctions avoid thermal bridging and no further action is therefore proposed.

Where thermal bridging is not clearly avoided and is of concern to the designers, e.g. non-standard details or junctions, further investigation may be required.

For these cases the design team, in consultation with the client, have agreed that the approach to thermal bridging will be in full accordance with the methodology described within the appropriate British Standard, which in this instance is BS EN10211 "Thermal Bridges in Building Construction, heat flows and surface temperatures, detailed calculations" and the Building Research Establishment (BRE) BR 497 "Conventions or Calculating Linear thermal transmittance and Temperature".

The report of the calculation shall be based on the site specific details as designed and drawn and contained the following information:

a) description of structure:

- building plans including dimensions and materials;
- other relevant remarks.

b) description of the geometrical model:

- 2-D or 3-D geometrical model with dimensions;
- input data showing the location of the construction planes and any auxiliary planes, together with the thermal conductivities of the various materials;
- the applied boundary temperatures;
- a calculation of the boundary temperature in an adjacent area, when appropriate;
- the surface resistances and the areas to which they apply;
- any dimensional adjustments;
- any quasi-homogeneous layers and the thermal conductivities calculated; and
- any non-standard values used with justification of the deviation from standard values.

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